Docket No. 21.1966-CRE-C\JCG

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reissue Application of	:	
Yoshio SATOH, et al	:	Group: 2817 (Anticipated)
Serial No. TBA	:	Examiner: B. Summons (Anticipated)
Filed: August 10, 2001	:	
For: SURFACE ACOUSTIC WAVE FILTER	:	

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Before examination of the above-identified application, please amend the application as follows:

IN THE SPECIFICATION:

Please AMEND the specification as follows. Please note that the bracketing and underling are provided as required under 37 C.F.R. §1.173(d):

Please insert before the first sentence --Cross Reference to Related Applications

This application is a continuation of application number 09/314,943 filed May 20, 1999 the contents of which are hereby incorporated by referenced. This application is related to application number 09/158,074 filed September 22, 1998.--

Please amend the paragraph at column 4, line 34 as follows:

Fig. 64 is a circuit diagram of a [conventional] comparative example of the SAW filter;

Please amend the paragraph at column 22, lines 45-56 as follows:

Fig. **64** shows a [conventional] comparative example of the SAW filter [related to the SAW filter] 250 according to the twelfth embodiment of the present invention as a related art. In each of the filters shown in FIGS. **54** and **64**, the design specification of each series-arm SAW resonator indicated by impedance Z_s is such that the aperture length is 90 μm and the number of finger pairs is 100. The design specification of each parallel-arm SAW resonator indicated by admittance Y_p is the same as the above design specification. The piezoelectric substrate crystal is made of 36º Y-cut X-propagation $LiTaO_3$. On the crystal substrate, an interdigital pattern for each SAW resonator formed with an Al alloy pattern having a thickness of 3000Å is provided.

Please amend the paragraph at column 22, line 64 to page 23, line 6 as follows:

Curve **253** shown in FIG. 57 shows a band characteristic of [the conventional filter shown in FIG. **64** in which] such an embodiment that the number of finger pairs of only the parallel-arm resonator indicated by admittance Y_p is reduced from 100 to 80 to thereby reduce the value of the admittance Y_p. It can be seen from FIG. **57** that the insertion loss in the pass band is improved. It may be said that the insertion loss can be somewhat improved even by reducing the admittance of the resonator at the end of the filter by a quantity less than ½. The above holds true for impedance.

IN THE CLAIMS:

Please **CANCEL** claims 2-5 and 7-21 and **AMEND** claims 1 and 6 as follows. Cancelled original patent claims 2-5 and 7 are set forth below with bracketing.

1. (ONCE AMENDED) A band-pass filter having a pair of band-pass filter input terminals and plural pairs of band-pass filter output terminals, comprising:

a pair of SAW filters having respective pass bands and comprising a plurality of one-port SAW resonators connected in a multiple ladder structure, each having at least a first stage located at a side of the pair of band-pass filter input terminals and a series-arm resonator located at the first stage, a pair of input terminals and a pair of output terminals;

the pair of band-pass filter input terminals being commonly connected to the respective pairs of input terminals of the pair of SAW filters;

the plurality of pairs of band-pass filter output terminals being connected to the respective pairs of output terminals of the pair of SAW filters; and

an inductance element located between at least one of the SAW filters located at the first stage and the pair of band-pass filter input terminals and directly connected between the respective pair of input terminals of the at least one of the SAW filters and thereby in parallel to said at least one of the SAW filters.

[2. A SAW filter comprising:

a plurality of first SAW resonators, each having a pair of terminals and a predetermined resonance frequency (f_{rp}), said first SAW resonators being connected in respective, parallel arms of the SAW filter;

a plurality of second SAW resonators, each having a pair of terminals and a predetermined resonance frequency (f_{rs}) approximately equal to an antiresonance frequency (f_{ap}) of each of the first SAW resonators, said second SAW resonators being provided in series arms of the SAW filter; and

inductance elements respectively connected in series with the first SAW resonators in the parallel arms and formed of wires.]

[3. The SAW filter as claimed in claim 2, further comprising:

a package accommodating the first and second resonators and the inductance elements; and lead terminals extending from interiorly of the package to exteriorly thereof,

said wires of the inductance elements being bonded to said lead terminals.]

[4. A band-pass filter having a predetermined pass-band characteristic and comprising:

a plurality of SAW resonators connected in a ladder formation, said plurality of resonators being connected in respective serial arms and parallel arms; and bonding inductance elements, said parallel arms of said ladder formation being connected to ground via respective said bonding inductance elements.]

[5. The band-pass filter as claimed in claim 4, wherein said bonding inductance elements comprise wires.]

6. (ONCE AMENDED) A band-pass filter having a pair of band-pass filter input terminals and plural pairs of band-pass filter output terminals, comprising:

[a pair of SAW filters having respective, different pass bands and each SAW filter having a pair of SAW filter input terminals and a pair of SAW filter output terminals and comprising a plurality of one-port SAW resonators connected in a ladder structure between the input and output terminals and including at least a first stage having a series-arm SAW resonator connected to one of the pair of input terminals;]

a pair of SAW filters having respective pass bands and comprising a plurality of one-port SAW resonators connected in a multiple ladder structure, each having at least a first stage located at a side of the pair of band-pass filter input terminals and a series-arm resonator located at the first stage, a pair of input terminals and a pair of output terminals;

the pair of band-pass filter input terminals being commonly connected to the respective pairs of [output] input terminals of the pair of SAW filters;

the plurality of pairs of band-pass filter output terminals being connected to the respective pairs of output terminals of the pair of SAW filters.

[7. A band-pass filter having a predetermined pass-band characteristic and comprising:

a plurality of SAW resonators connected in a ladder configuration of respective serial arms and parallel arms, said plurality of SAW resonators being connected in respective said serial arms and parallel arms; and

bonding inductance elements respectively connecting said parallel arms of said ladder configuration to ground.]

Please **ADD** the following new claims.

22. (NEW) A SAW filter comprising:

a first SAW resonator having a pair of terminals and a predetermined resonance frequency (frp), said first SAW resonator being provided in a parallel arm of the SAW filter; and

a second SAW resonator having a pair of terminals and a predetermined resonance frequency (frs) approximately equal to a predetermined antiresonance frequency of the first

SAW resonator (fap), said second SAW resonator being provided in a series arm of the SAW filter; and

an inductance element connected in series with the first SAW resonator in the parallel arm, the inductance element functioning to increase the admittance of the parallel arm and decrease the resonance frequency, wherein

the first SAW resonator comprises an exciting interdigital electrode and first and second reflectors, each of which comprises either aluminum or an aluminum alloy containing a few weight percentage of metal, other than aluminum; and

the respective film thicknesses of the exciting interdigital electrode and the first and second reflectors are in a range of from 0.06 to 0.09 times the period of the exciting interdigital electrode.

23. (NEW) A SAW filter comprising:

a first SAW resonator having a pair of terminals and a predetermined resonance frequency (frp), said first SAW resonator being provided in a parallel arm of the SAW filter; and

a second SAW resonator having a pair of terminals and a predetermined resonance frequency (frs) approximately equal to a predetermined antiresonance frequency of the first SAW resonator (fap), said second SAW resonator being provided in a series arm of the SAW filter; and

an inductance element connected in series with the first SAW resonator in the parallel arm, the inductance element functioning to increase the admittance of the parallel arm and decrease the resonance frequency, wherein

the first SAW resonator comprises an exciting interdigital electrode and first and second reflectors, each of which comprises either gold or a gold alloy containing a few weight percentage of metal other than gold; and the respective film thicknesses of the exciting interdigital electrode and the first and second reflectors are in a range of from 0.0086 to 0.013 times the period of the exciting interdigital electrode.

24. (NEW) A SAW filter comprising:

a plurality of first SAW resonators on a single piezoelectric substrate, each having a pair of terminals and a predetermined resonance frequency (frp), said first SAW resonators being connected in respective, parallel arms of the SAW filter;

a plurality of second SAW resonators on the piezoelectric substrate, each having a pair of terminals and a predetermined resonance frequency (frs) approximately equal to the predetermined antiresonance frequency of the first SAW resonator (fap), said second SAW resonators being provided in a series arm of the SAW filter; and

inductance elements respectively connected in series with the first SAW resonators in the parallel arms.

25. (NEW) A band-pass filter having a pair of band-pass filter input terminals and plural pairs of band-pass filter output terminals, comprising:

a first SAW filter having a pass band, having a band center frequency and comprising a plurality of one-port SAW resonators connected in a multiple ladder structure, having at least a first stage located at a side of the pair of band-pass filter input terminals and a series-arm resonator located at the first stage, a pair of input terminals and a pair of output terminals;

a second SAW filter having different pass band from the pass band of the first SAW filter, having a band center frequency which is larger than the band center frequency of the first SAW filter and comprising a plurality of one-port SAW resonators connected in a multiple ladder structure, having at least a first stage located at a side of the pair of band-pass filter input terminals and a series-arm resonator located at the first stage, a pair of input terminals and a pair of output terminals;

the pair of band-pass filter input terminals being commonly connected to the respective pairs of input terminals of the first and second SAW filters;

the plurality of pairs of band-pass filter output terminals being connected to the respective pairs of output terminals of the first and second SAW filters; and

an impedance matching circuit located between the first stage of the second SAW filter and the pair of input terminals of the second SAW filter and thereby directly connected between the respective pair of input terminals of the second SAW filter and in parallel to the second SAW filter.

26. (NEW) The band-pass filter as claimed in claim 25, wherein the impedance matching circuit includes an inductor.

27. (NEW) The band-pass filter as claimed in claim 26, wherein the inductor is formed with a metallic strip line.

28. (NEW) The band-pass filter as claimed in claim 27, wherein the metallic strip line is formed on a ceramic package.

29. (NEW) A band-pass filter comprising:

a first SAW filter having a pass band, having a band center frequency and comprising a plurality of one-port SAW resonators connected in a multiple ladder structure, having at least a first stage and a series-arm resonator located at the first stage, a pair of input terminals and a pair of output terminals;

a second SAW filter having a different pass band from the pass band of the first SAW filter, having a band center frequency which is larger than the band center frequency of the first SAW filter and comprising a plurality of one-port SAW resonators connected in a multiple ladder structure, having at least a first stage and a series-arm resonator located at the first stage, a pair of input terminals and a pair of output terminals;

a pair of band pass filter input terminals commonly connected to the pair of the input terminals of the first and second SAW filters;

a plurality of pairs of band pass filter output terminals respectively connected to the pair of the output terminals of the first and second SAW filters;

an inductance element, located between the first stage of the second SAW filter and the pair of input terminals of the second SAW filter and thereby directly connected between the respective pair of input terminals of the second SAW filter and in parallel to the second SAW filter; and

a capacitance element connected in series between said inductance element and said series-arm resonator of the first stage of the second SAW filter.

30. (NEW) A band-pass filter comprising:

a first SAW filter having a pass band, having a band center frequency and comprising a plurality of one-port SAW resonators connected in a multiple ladder structure, having at least a first stage and a series-arm resonator located at the first stage, a pair of input terminals and a pair of output terminals;

a second SAW filter having a different pass band from the pass band of the first SAW filter, having a band center frequency which is larger than the band center frequency of the first SAW filter and comprising a plurality of one-port SAW resonators connected in a multiple ladder

structure, having at least a first stage and a parallel-arm resonator located at the first stage, a pair of input terminals and a pair of output terminals;

a pair of band pass filter input terminals commonly connected to the pair of the input terminals of the first and second SAW filters;

a plurality of pairs of band pass filter output terminals respectively connected to the pair of the output terminals of the first and second SAW filters;

a line used for phase rotation and connected in series between one of the pair of input terminals and the second one of the SAW filters.

31. (NEW) The band-pass filter as claimed in claim 30, wherein the line is formed on a glass-epoxy substrate or a ceramic substrate.

32. (NEW) The band-pass filter as claimed in claim 30, further comprising an inductance element located between the second SAW filter and the pair of input terminals of the second SAW filter.

33. (NEW) The band-pass filter as claimed in claim 32, further comprising a capacitance element connected in series between the inductance element and the first stage of the second SAW filters.

REMARKS

This Preliminary Amendment is submitted to improve the form of the application as originally-filed, and to add new claims 22-33. Claims 1, 6 and 22-33 are now pending.

Also filed concurrently herewith are an Information Disclosure Statement and a Letter to the Examiner Requesting Approval of Changes to the Drawings. The same drawing changes were filed and approved in the parent application.

It is respectfully requested that this Preliminary Amendment be entered in the above-referenced application.

If any further fees are required in connection with the filing of this Preliminary Amendment, please charge same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

By: ______________________

John C. Garvey
Registration No. 28,607

700 Eleventh Street, N.W.
Suite 500
Washington, D.C. 20001
(202) 434-1500
Date: 8-10-01

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Please AMEND the specification as follows. Please note that the bracketing and underling are provided as required under 37 C.F.R. §1.173(d):

Please insert before the first sentence --Cross Reference to Related Applications

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Fig. 64 is a circuit diagram of a [conventional] comparative example of the SAW filter;

Please amend the paragraph at column 22, lines 45-56 as follows:

Fig. **64** shows a [conventional] comparative example of the SAW filter [related to the SAW filter] 250 according to the twelfth embodiment of the present invention as a related art. In each of the filters shown in FIGS. **54** and **64**, the design specification of each series-arm SAW resonator indicated by impedance Z_s is such that the aperture length is 90 μm and the number of finger pairs is 100. The design specification of each parallel-arm SAW resonator indicated by admittance Y_p is the same as the above design specification. The piezoelectric substrate crystal is made of 36º Y-cut X-propagation $LiTaO_3$. On the crystal substrate, an interdigital pattern for each SAW resonator formed with an Al alloy pattern having a thickness of 3000Å is provided.

Please amend the paragraph at column 22, line 64 to page 23, line 6 as follows:

Curve **253** shown in FIG. 57 shows a band characteristic of [the conventional filter shown in FIG. **64** in which] such an embodiment that the number of finger pairs of only the parallel-arm resonator indicated by admittance Y_p is reduced from 100 to 80 to thereby reduce the value of the admittance Y_p. It can be seen from FIG. **57** that the insertion loss in the pass band is

improved. It may be said that the insertion loss can be somewhat improved even by reducing the admittance of the resonator at the end of the filter by a quantity less than ½. The above holds true for impedance.

IN THE CLAIMS:

Please **CANCEL** claims 2-5 and 7-21 and **AMEND** claims 1 and 6 as follows. Cancelled original patent claims 2-5 and 7 are set forth below with bracketing.

1. (ONCE AMENDED) A band-pass filter having a pair of band-pass filter input terminals and plural pairs of band-pass filter output terminals, comprising:

a pair of SAW filters having respective pass bands and comprising a plurality of one-port SAW resonators connected in a multiple ladder structure, each having at least a first stage located at a side of the pair of band-pass filter input terminals and a series-arm resonator located at the first stage, a pair of input terminals and a pair of output terminals;

the pair of band-pass filter input terminals being commonly connected to the respective pairs of input terminals of the pair of SAW filters;

the plurality of pairs of band-pass filter output terminals being connected to the respective pairs of output terminals of the pair of SAW filters; and

an inductance element located between at least one of the SAW filters located at the first stage and the pair of band-pass filter input terminals and directly connected between the respective pair of input terminals of the at least one of the SAW filters and thereby in parallel to said at least one of the SAW filters.

[2. A SAW filter comprising:

a plurality of first SAW resonators, each having a pair of terminals and a

predetermined resonance frequency (f_{rp}), said first SAW resonators being connected in respective, parallel arms of the SAW filter;

a plurality of second SAW resonators, each having a pair of terminals and a

predetermined resonance frequency (f_{rs}) approximately equal to an antiresonance frequency (f_{ap}) of each of the first SAW resonators, said

second SAW resonators being provided in series arms of the SAW filter; and

inductance elements respectively connected in series with the first SAW resonators in the parallel arms and formed of wires.}

[3. The SAW filter as claimed in claim 2, further comprising:

a package accommodating the first and second resonators and the inductance elements; and lead terminals extending from interiorly of the package to exteriorly thereof,

said wires of the inductance elements being bonded to said lead terminals.]

[4. A band-pass filter having a predetermined pass-band characteristic and comprising:

a plurality of SAW resonators connected in a ladder formation, said plurality of resonators being connected in respective serial arms and parallel arms; and bonding inductance elements, said parallel arms of said ladder formation being connected to ground via respective said bonding inductance elements.]

[5. The band-pass filter as claimed in claim 4, wherein said bonding inductance elements comprise wires.]

6. (ONCE AMENDED) A band-pass filter having a pair of band-pass filter input terminals and plural pairs of band-pass filter output terminals, comprising:

[a pair of SAW filters having respective, different pass bands and each SAW filter having a pair of SAW filter input terminals and a pair of SAW filter output terminals and comprising a plurality of one-port SAW resonators connected in a ladder structure between the input and output terminals and including at least a first stage having a series-arm SAW resonator connected to one of the pair of input terminals;]

a pair of SAW filters having respective pass bands and comprising a plurality of one-port SAW resonators connected in a <u>multiple</u> ladder structure, each having at least a first stage located at a side of the pair of band-pass filter input terminals and a series-arm resonator located at the first stage, a pair of input terminals and a pair of output terminals;

the pair of band-pass filter input terminals being commonly connected to the respective pairs of [output] <u>input</u> terminals of the pair of SAW filters;

the plurality of pairs of band-pass filter output terminals being connected to the respective pairs of output terminals of the pair of SAW filters.

[7. A band-pass filter having a predetermined pass-band characteristic and comprising:

a plurality of SAW resonators connected in a ladder configuration of respective serial arms and parallel arms, said plurality of SAW resonators being connected in respective said serial arms and parallel arms; and

bonding inductance elements respectively connecting said parallel arms of said ladder configuration to ground.]

Please **ADD** the following new claims.

22. (NEW) A SAW filter comprising:

a first SAW resonator having a pair of terminals and a predetermined resonance frequency (frp), said first SAW resonator being provided in a parallel arm of the SAW filter; and

a second SAW resonator having a pair of terminals and a predetermined resonance frequency (frs) approximately equal to a predetermined antiresonance frequency of the first SAW resonator (fap), said second SAW resonator being provided in a series arm of the SAW filter; and

an inductance element connected in series with the first SAW resonator in the parallel arm, the inductance element functioning to increase the admittance of the parallel arm and decrease the resonance frequency, wherein

the first SAW resonator comprises an exciting interdigital electrode and first and second reflectors, each of which comprises either aluminum or an aluminum alloy containing a few weight percentage of metal, other than aluminum; and

the respective film thicknesses of the exciting interdigital electrode and the first and second reflectors are in a range of from 0.06 to 0.09 times the period of the exciting interdigital electrode.

23. (NEW) A SAW filter comprising:

a first SAW resonator having a pair of terminals and a predetermined resonance frequency (frp), said first SAW resonator being provided in a parallel arm of the SAW filter; and

a second SAW resonator having a pair of terminals and a predetermined resonance frequency (frs) approximately equal to a predetermined antiresonance frequency of the first SAW resonator (fap), said second SAW resonator being provided in a series arm of the SAW filter; and

an inductance element connected in series with the first SAW resonator in the parallel arm, the inductance element functioning to increase the admittance of the parallel arm and decrease the resonance frequency, wherein

the first SAW resonator comprises an exciting interdigital electrode and first and second reflectors, each of which comprises either gold or a gold alloy containing a few weight percentage of metal other than gold; and the respective film thicknesses of the exciting interdigital electrode and the first and second reflectors are in a range of from 0.0086 to 0.013 times the period of the exciting interdigital electrode.

24. (NEW) A SAW filter comprising:

a plurality of first SAW resonators on a single piezoelectric substrate, each having a pair of terminals and a predetermined resonance frequency (frp), said first SAW resonators being connected in respective, parallel arms of the SAW filter;

a plurality of second SAW resonators on the piezoelectric substrate, each having a pair of terminals and a predetermined resonance frequency (frs) approximately equal to the predetermined antiresonance frequency of the first SAW resonator (fap), said second SAW resonators being provided in a series arm of the SAW filter; and

inductance elements respectively connected in series with the first SAW resonators in the parallel arms.

25. (NEW) A band-pass filter having a pair of band-pass filter input terminals and plural pairs of band-pass filter output terminals, comprising:

a first SAW filter having a pass band, having a band center frequency and comprising a plurality of one-port SAW resonators connected in a multiple ladder structure, having at least a first stage located at a side of the pair of band-pass filter input terminals and a series-arm resonator located at the first stage, a pair of input terminals and a pair of output terminals;

a second SAW filter having different pass band from the pass band of the first SAW filter, having a band center frequency which is larger than the band center frequency of the first SAW filter and comprising a plurality of one-port SAW resonators connected in a multiple ladder

structure, having at least a first stage located at a side of the pair of band-pass filter input terminals and a series-arm resonator located at the first stage, a pair of input terminals and a pair of output terminals;

the pair of band-pass filter input terminals being commonly connected to the respective pairs of input terminals of the first and second SAW filters;

the plurality of pairs of band-pass filter output terminals being connected to the respective pairs of output terminals of the first and second SAW filters; and

an impedance matching circuit located between the first stage of the second SAW filter and the pair of input terminals of the second SAW filter and thereby directly connected between the respective pair of input terminals of the second SAW filter and in parallel to the second SAW filter.

26. (NEW) The band-pass filter as claimed in claim 25, wherein the impedance matching circuit includes an inductor.

27. (NEW) The band-pass filter as claimed in claim 26, wherein the inductor is formed with a metallic strip line.

28. (NEW) The band-pass filter as claimed in claim 27, wherein the metallic strip line is formed on a ceramic package.

29. (NEW) A band-pass filter comprising:

a first SAW filter having a pass band, having a band center frequency and comprising a plurality of one-port SAW resonators connected in a multiple ladder structure, having at least a first stage and a series-arm resonator located at the first stage, a pair of input terminals and a pair of output terminals;

a second SAW filter having a different pass band from the pass band of the first SAW filter, having a band center frequency which is larger than the band center frequency of the first SAW filter and comprising a plurality of one-port SAW resonators connected in a multiple ladder structure, having at least a first stage and a series-arm resonator located at the first stage, a pair of input terminals and a pair of output terminals;

a pair of band pass filter input terminals commonly connected to the pair of the input terminals of the first and second SAW filters;

a plurality of pairs of band pass filter output terminals respectively connected to the pair of the output terminals of the first and second SAW filters;

an inductance element, located between the first stage of the second SAW filter and the pair of input terminals of the second SAW filter and thereby directly connected between the respective pair of input terminals of the second SAW filter and in parallel to the second SAW filter; and

a capacitance element connected in series between said inductance element and said series-arm resonator of the first stage of the second SAW filter.

30. (NEW) A band-pass filter comprising:

a first SAW filter having a pass band, having a band center frequency and comprising a plurality of one-port SAW resonators connected in a multiple ladder structure, having at least a first stage and a series-arm resonator located at the first stage, a pair of input terminals and a pair of output terminals;

a second SAW filter having a different pass band from the pass band of the first SAW filter, having a band center frequency which is larger than the band center frequency of the first SAW filter and comprising a plurality of one-port SAW resonators connected in a multiple ladder structure, having at least a first stage and a parallel-arm resonator located at the first stage, a pair of input terminals and a pair of output terminals;

a pair of band pass filter input terminals commonly connected to the pair of the input terminals of the first and second SAW filters;

a plurality of pairs of band pass filter output terminals respectively connected to the pair of the output terminals of the first and second SAW filters;

a line used for phase rotation and connected in series between one of the pair of input terminals and the second one of the SAW filters.

31. (NEW) The band-pass filter as claimed in claim 30, wherein the line is formed on a glass-epoxy substrate or a ceramic substrate.

32. (NEW) The band-pass filter as claimed in claim 30, further comprising an inductance element located between the second SAW filter and the pair of input terminals of the second SAW filter.

33. (NEW) The band-pass filter as claimed in claim 32, further comprising a capacitance element connected in series between the inductance element and the first stage of the second SAW filters.

FIG.53

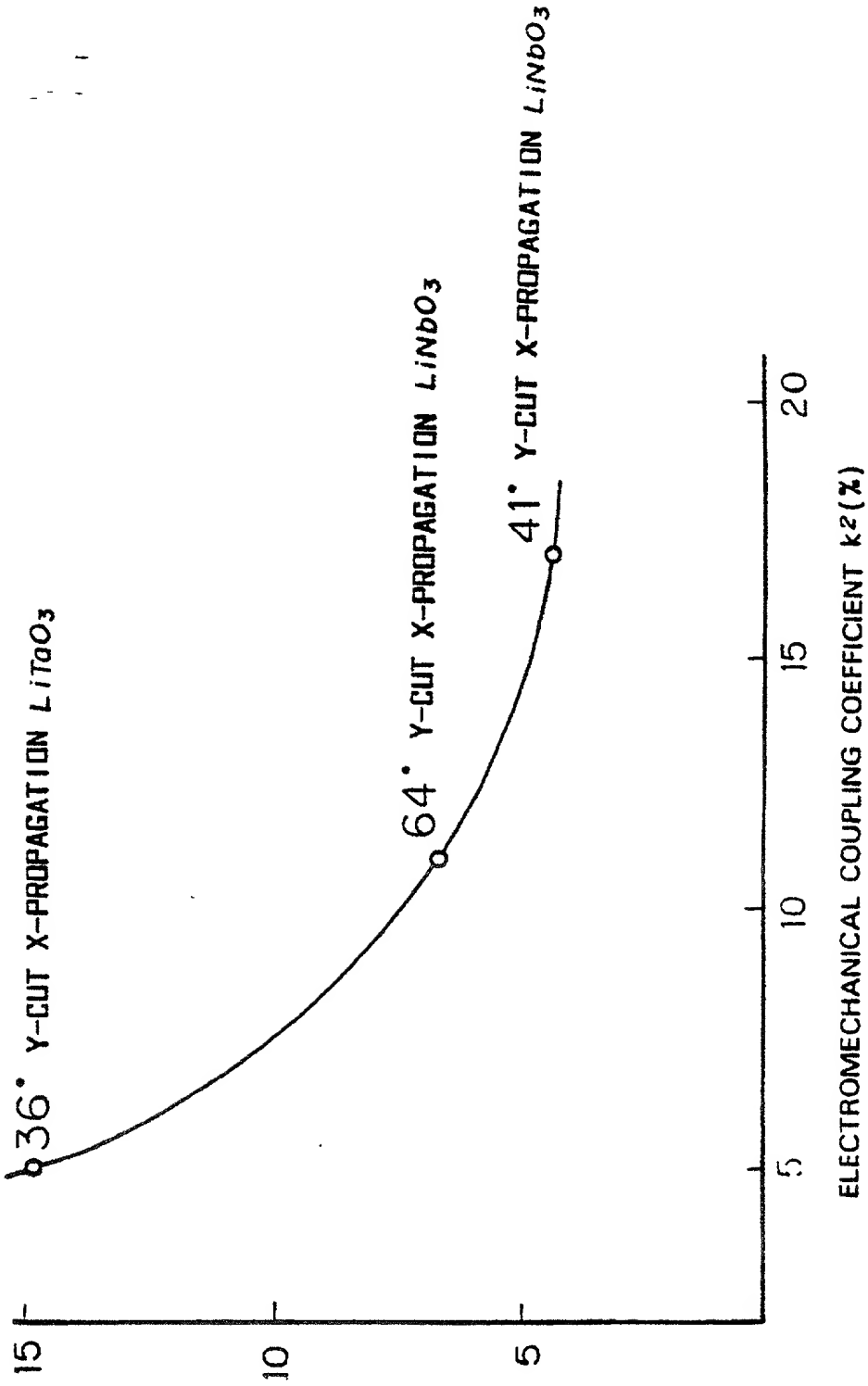
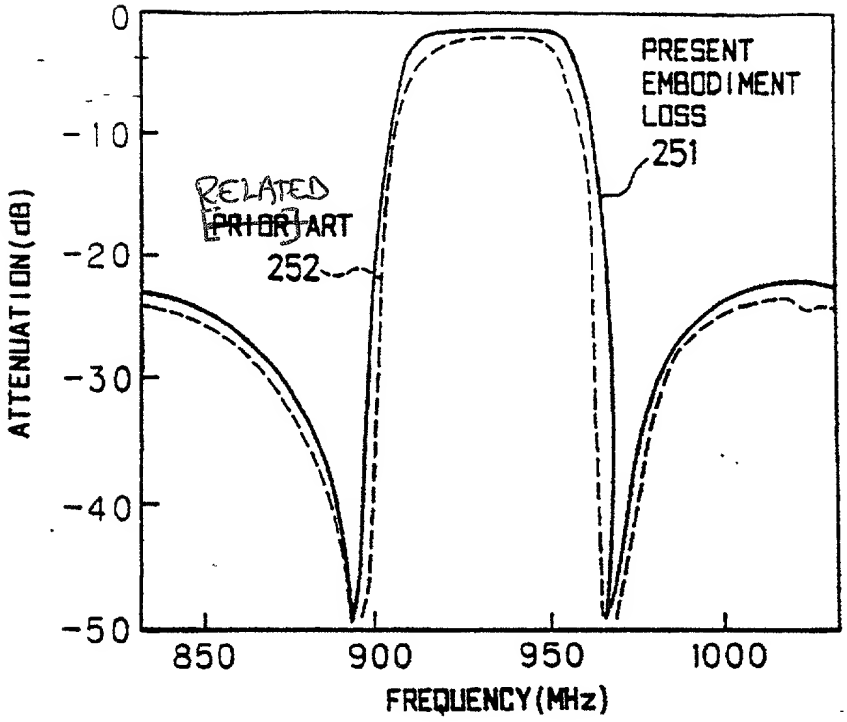

36° Y-CUT X-PROPAGATION $LiTaO_3$
64° Y-CUT X-PROPAGATION $LiNbO_3$
41° Y-CUT X-PROPAGATION $LiNbO_3$
15
10
5
5
10
15
20
ELECTROMECHANICAL COUPLING COEFFICIENT k^2(%)

FIG.56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-20
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-40
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ATTENUATION(dB)
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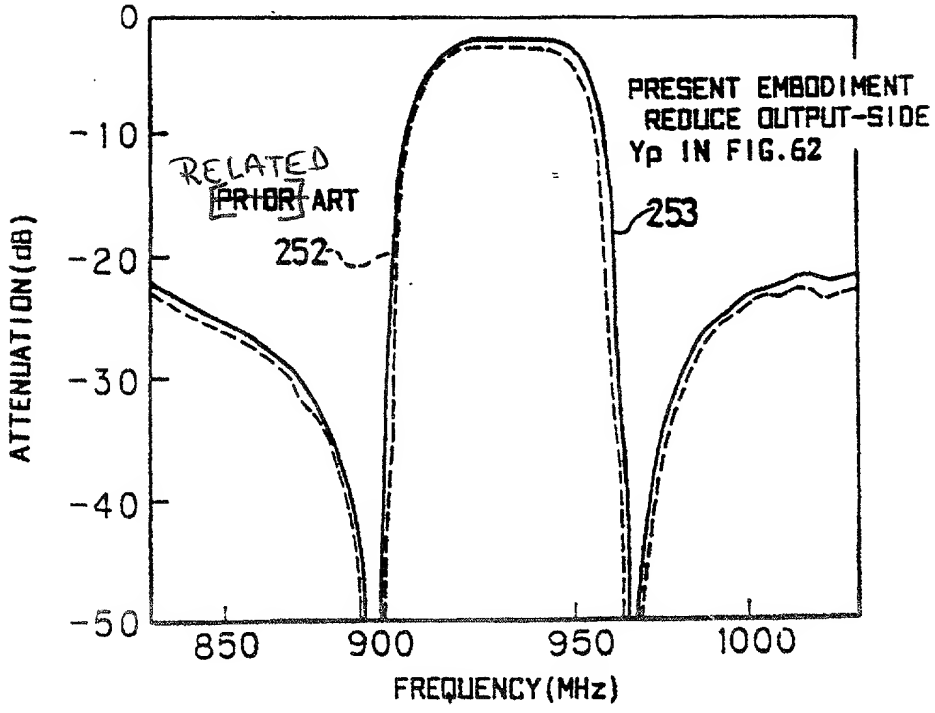
950
1000
FREQUENCY(MHz)
PRESENT EMBODIMENT LOSS
251
RELATED [PRIOR] ART
252

FIG.57


0
-10
-20
-30
-40
-50
ATTENUATION(dB)
850
900
950
1000
FREQUENCY(MHz)
PRESENT EMBODIMENT REDUCE OUTPUT-SIDE Yp IN FIG.62
253
RELATED [PRIOR] ART
252

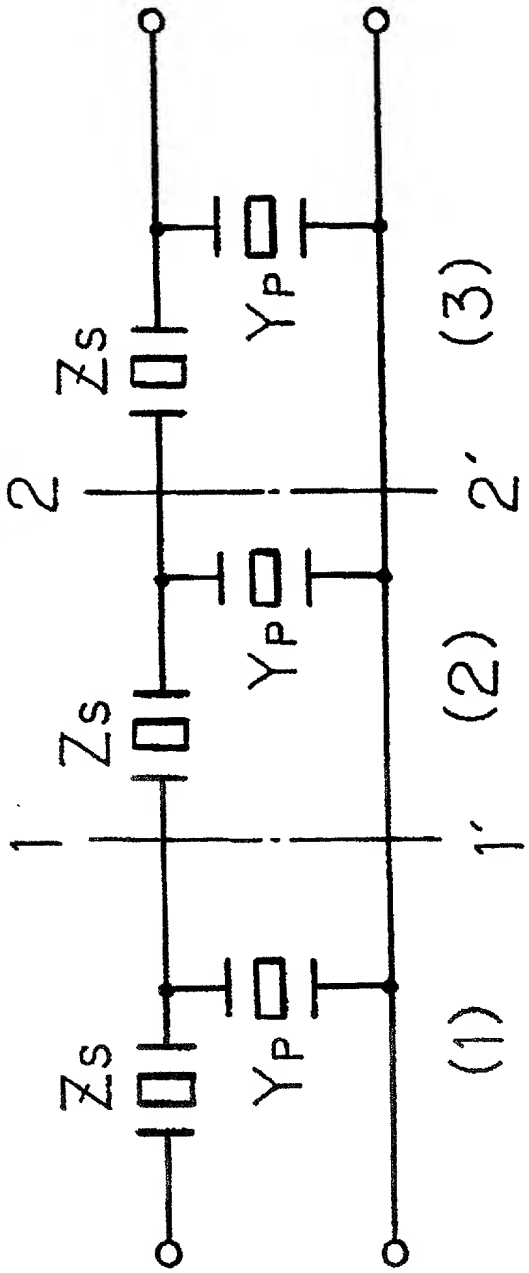


FIG.64 RELATED PRIOR ART

FIG. 1 PRIOR ART